CHAPTER 2

DESCRIPTION OF THE HOLSTON RIVER WATERSHED

2.1. BACKGROUND. The Holston River is a major river system of southwestern Virginia and East Tennessee. The three major forks of the Holston (its North, Middle, and South Forks) rise in southwestern Virginia and have their confluence near Kingsport, TN. From there the river flows roughly southwestward until it reaches its confluence with the French Broad River just east of downtown Knoxville, TN. This confluence is considered to be the headwaters of theTennessee River.

Native Americans called the Holston River “Hogoheegee.” Early explorers called it “Indian River” and French traders called it the “Cherokee River.” Today, the Holston River is named in honor of Stephen Holston (also spelled Holstein). Holston, an early explorer and surveyor with The Expedition of 1748, was the first settler to explore the Holston River system, including South Fork of the Holston River.

This Chapter describes the location and characteristics of the Holston River Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Holston River Watershed is located in East Tennessee and includes parts of Grainger, Hamblen, Hawkins, Jefferson, Knox, Sevier, Sullivan, and Union Counties.

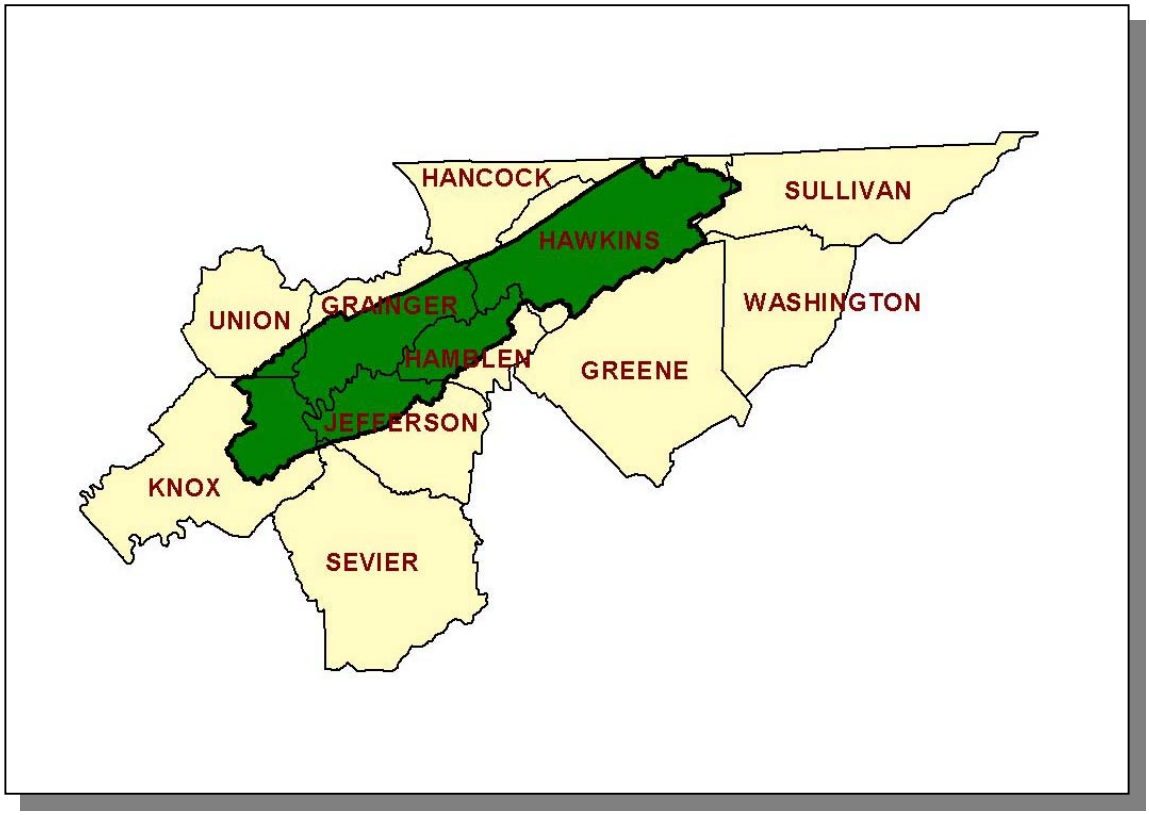

Figure 2-1. General Location of the Holston River Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
Hawkins	42.1
Grainger	21.9
Knox	11.7
Jefferson	10.8
Hamblen	10.6
Union	2.1
Sullivan	0.4
Greene	0.2
Sevier	0.2

Table 2-1. The Holston River Watershed Includes Parts of Nine East Tennessee Counties. *0.25 square miles in Hancock County and 0.08 square miles in Washington County are also in the watershed.*

2.2.B. Population Density Centers. Twenty-four highways serve the major communities in the Holston River Watershed.

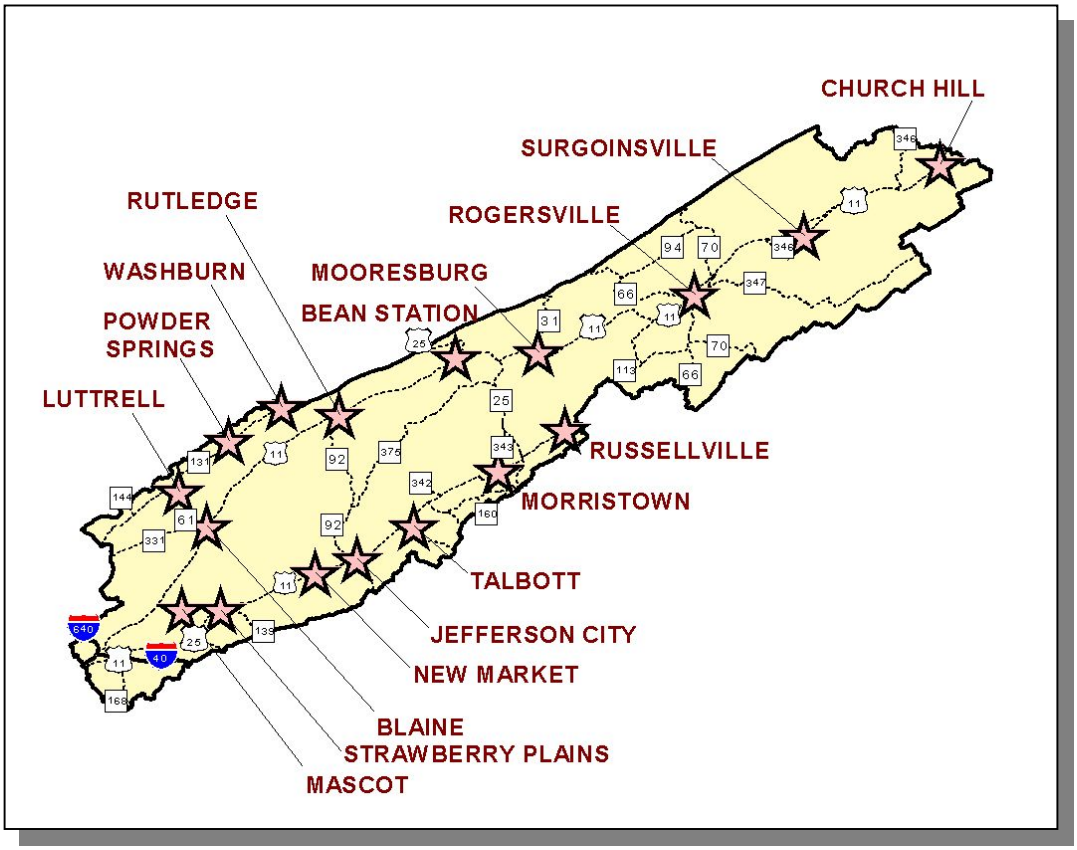

Figure 2-2. Communities and Roads in the Holston River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Morristown*	24,965	Hamblen
Jefferson City	7,760	Jefferson
Church Hill	5,916	Hawkins
Rogersville*	4,240	Hawkins
Bean Station	2,599	Grainger
Mascot	2,119	Knox
Blaine	1,585	Grainger
Surgoinsville	1,484	Hawkins
New Market	1,234	Jefferson
Rutledge*	1,187	Grainger
Luttrell	915	Union

Table 2-2. Municipalities in the Holston River Watershed. *Population based on 2000 census (Tennessee Blue Book) or http://www.hometownlocator.com. Asterisk (*) indicates county seat.*

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Holston River Watershed, designated 06010104 by the USGS, is approximately 999 square miles and drains to the Tennessee River.

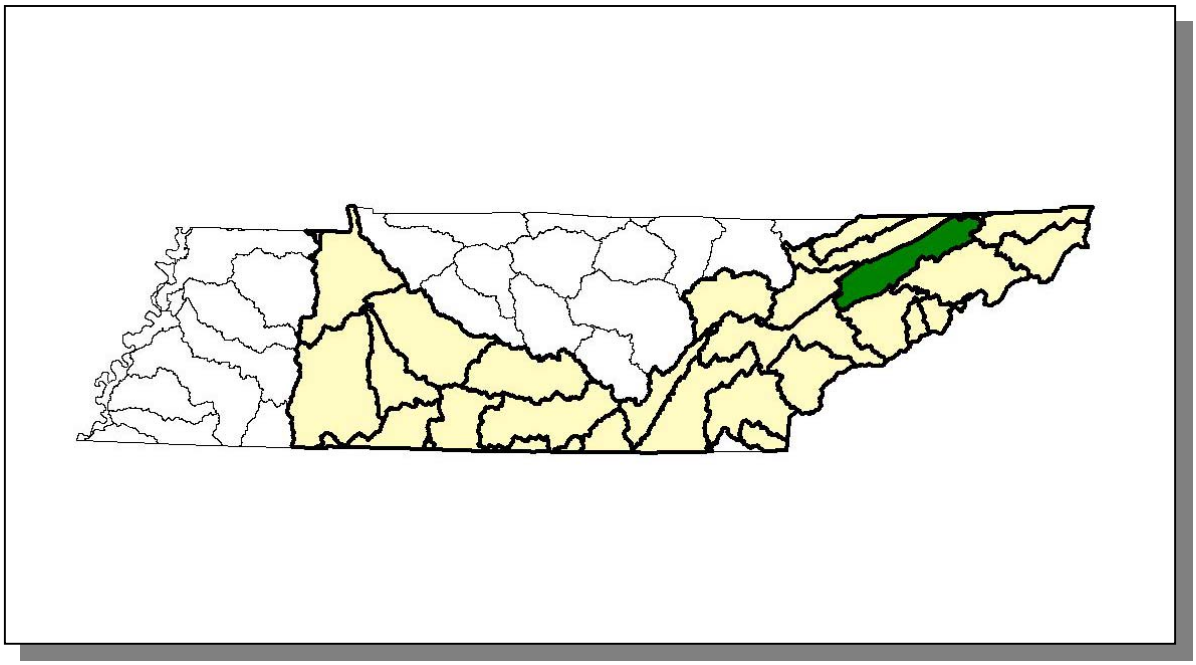

Figure 2-3. The Holston River Watershed is Part of the Tennesse River Basin.

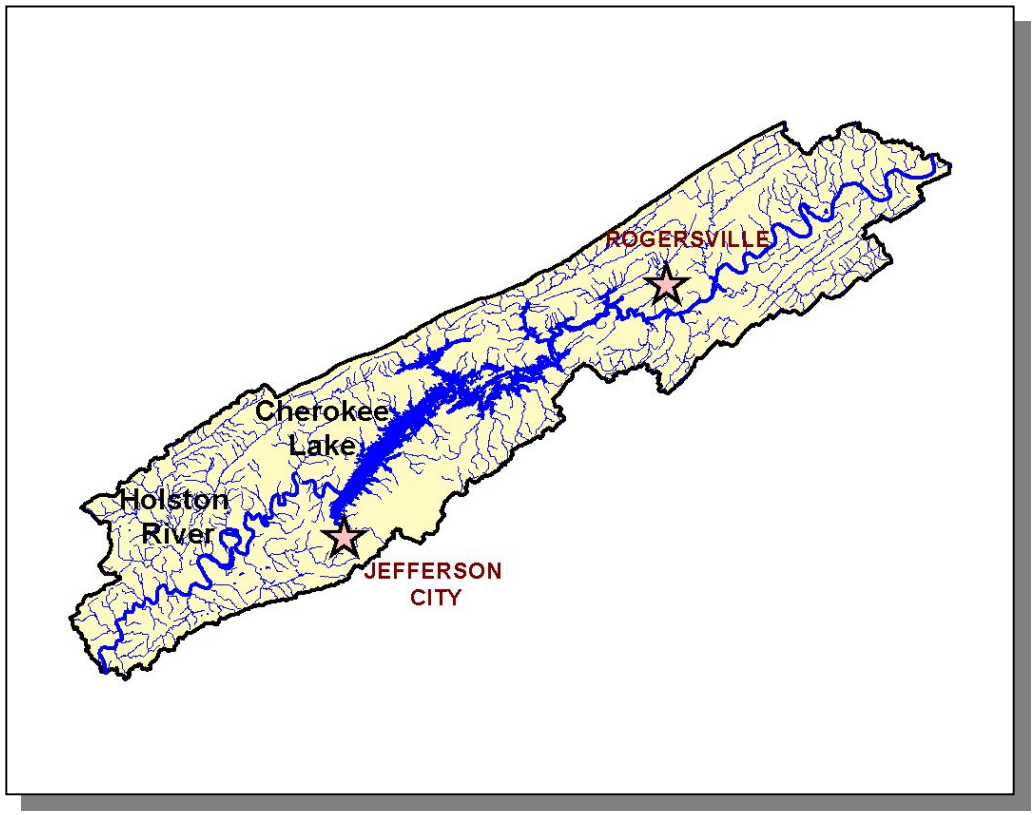

Figure 2-4. Hydrology in the Holston River Watershed. *There are 1,175.6 stream miles and 6,499 lake acres recorded in River Reach File 3 in the Holston River Watershed. Location of the Holston River, including Cherokee Lake, and the cities of Jefferson City and Rogersville are shown for reference.*

2.3.B. Dams. There are 16 dams inventoried by TDEC Division of Water Supply in the Holston River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

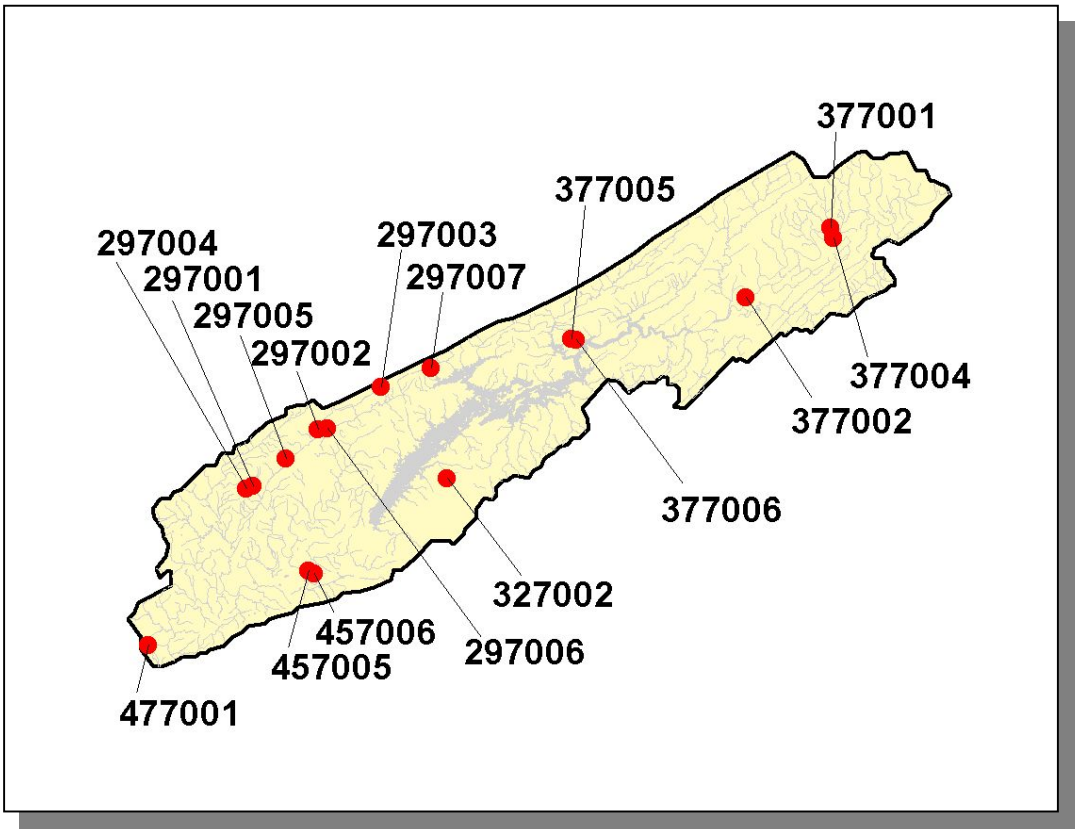

Figure 2-5. Location of Inventoried Dams in the Holston River Watershed. *More information is provided in Appendix II and at http://gwidc.memphis.edu/website/dws/.*

2.4. LAND USE. Land Use/Land Cover information was provided by EPA Region 4 and was interpreted from 1992 Multi-Resolution Land Cover (MRLC) satellite imagery.

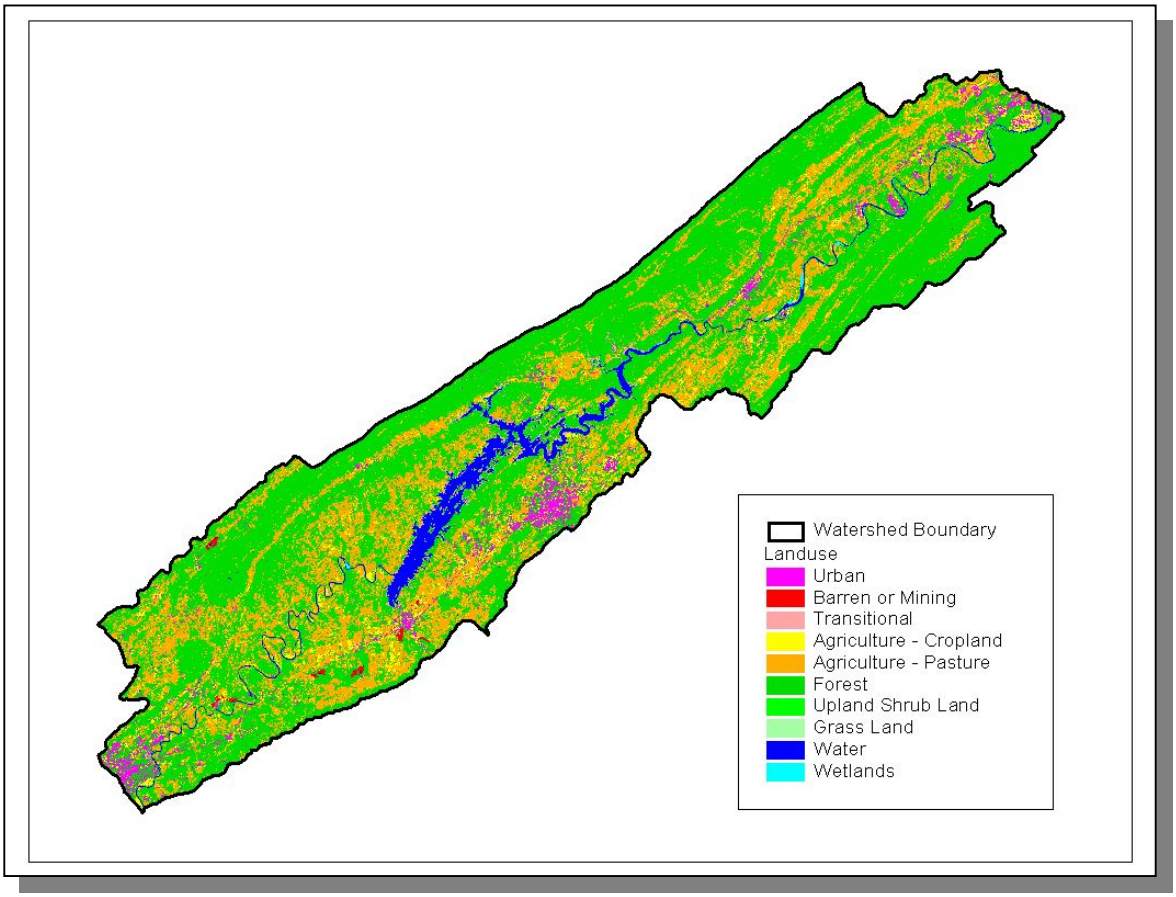

Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

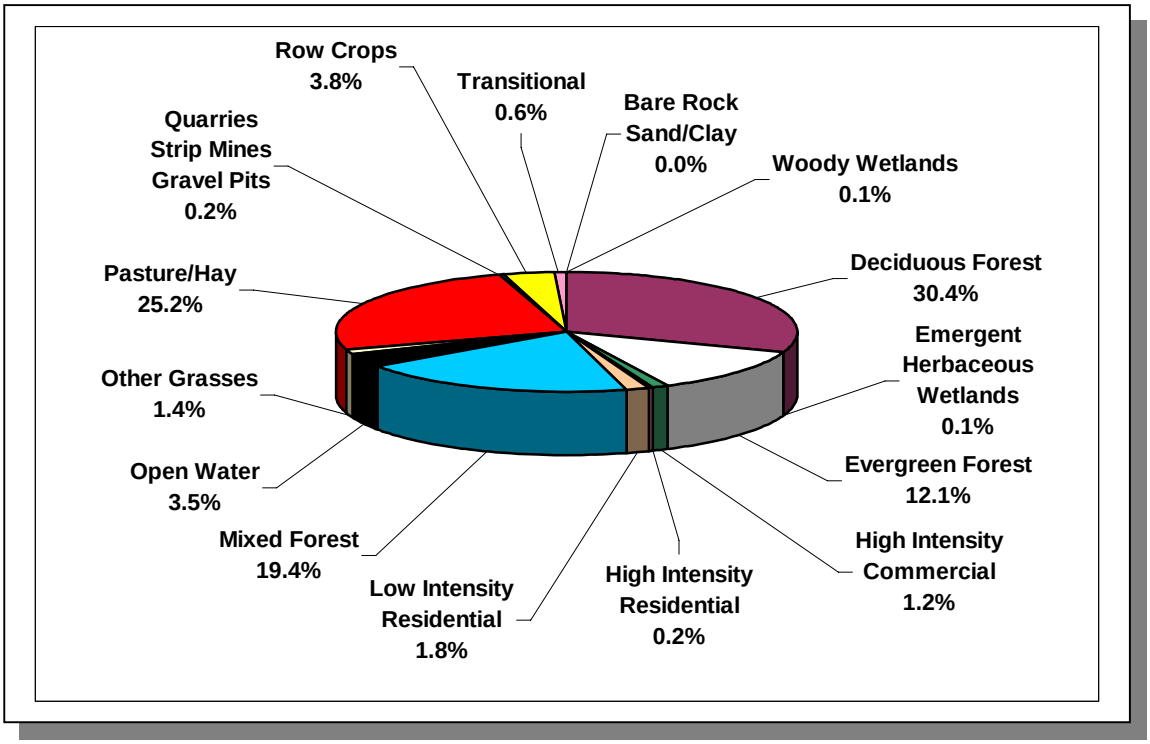

Figure 2-7. Land Use Distribution in the Holston River Watershed. *More information is provided in Appendix II.*

Sinkholes, springs, disappearing streams and caves characterize karst topography. The term "karst" describes a distinctive landform that indicates dissolution of underlying soluble rocks by surface water or ground water. Although commonly associated with limestone and dolomite (carbonate rocks), other highly soluble rocks such as gypsum and rock salt can be sculpted into karst terrain. In karst areas, the ground water flows through solution-enlarged channels, bedding planes and microfractures within the rock. The characteristic landforms of karst regions are: closed depressions of various size and arrangement; disrupted surface drainage; and caves and underground drainage systems. The term "karst" is named after a famous region in the former country of Yugoslavia.

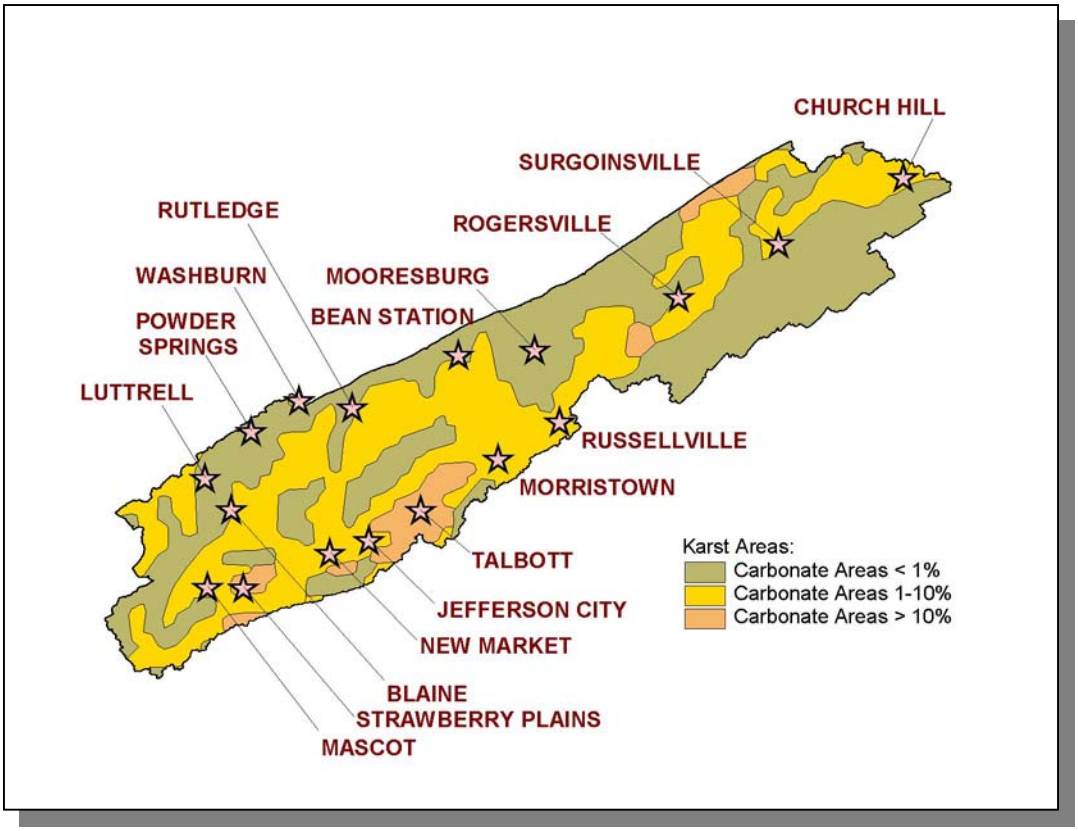

Figure 2-8. Illustration of Karst Areas in the Holston River Watershed. *Locations of communities in the watershed are shown for reference.*

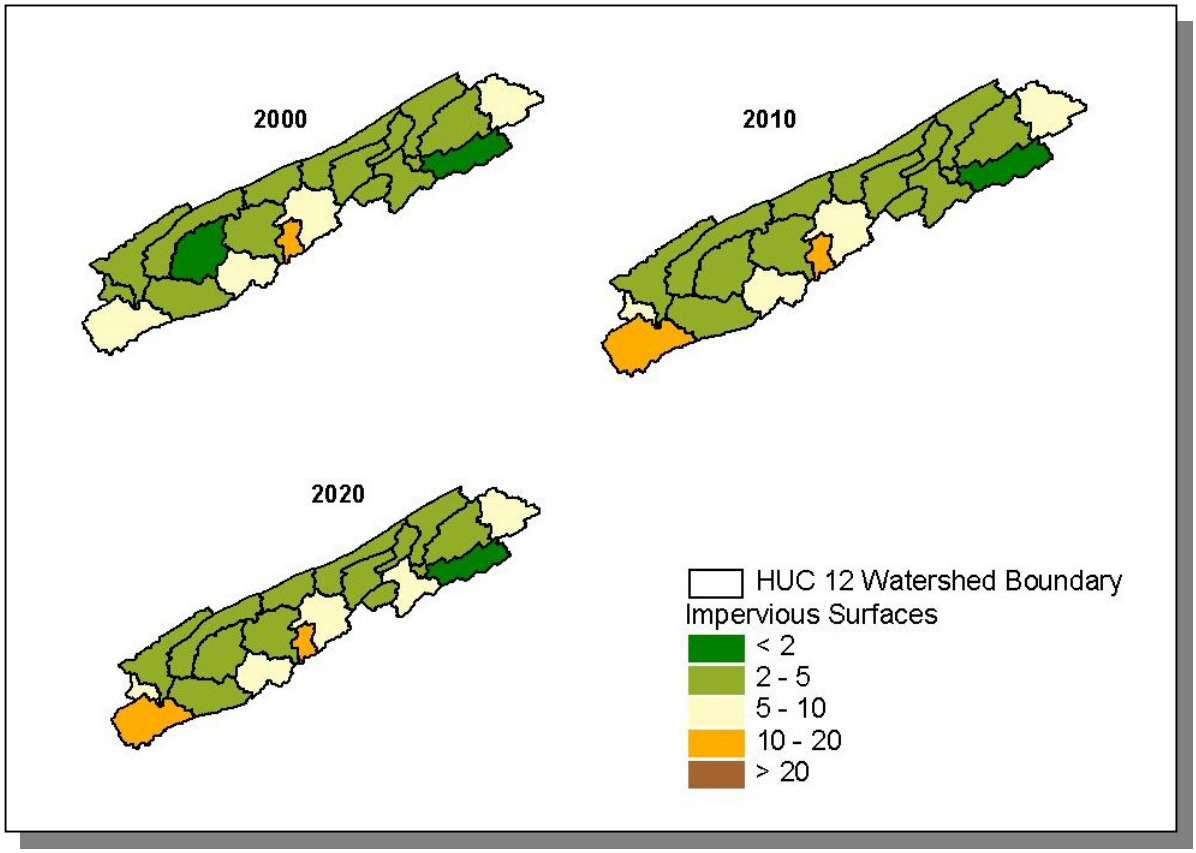

Figure 2-9. Illustration of Total Impervious Area in the Holston River Watershed. *All HUC-12 subwatersheds are shown. Current and projected total impervious cover is provided by EPA Region 4. More information can be found at: http://www.epa.gov/ATHENS/research/impervious/*

2.5. ECOREGIONS AND REFERENCE STREAMS. Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plant and animal life. Ecoregions serve as a spatial framework for the assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregion studies can aid the selection of regional stream reference sites, identifying high quality waters, and developing ecoregion-specific chemical and biological water quality criteria.

There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee. The Holston River Watershed lies within 1 Level III ecoregion (Ridge and Valley) and contains 4 Level IV subecoregions:

- The **Southern Limestone / Dolomite Valleys and Low Rolling Hills (67f)** ecoregion form a heterogeneous region composed predominantly of limestone and cherty dolomite. Landforms are mostly low rolling ridges and valleys, and the solids vary in their productivity. Landcover includes intensive agriculture, urban and industrial, or areas of thick forest. White oak forests, bottomland oak forests, and sycamore-ash-elm riparian forests are the common forest types, and grassland barrens intermixed with cedar-pine glades also occur here.

- The **Southern Shale Valleys (67g)** ecoregion consist of lowlands, rolling valleys, and slopes and hilly areas that are dominated by shale materials. The northern areas are associated with Ordovician-age calcareous shale, and the well-drained soils are often slightly acidic to neutral. In the south, the shale valleys are associated with Cambrian-age shales that contain some narrow bands of limestone, but the soils tend to be strongly acid. Small farms and rural residences subdivide the land. The steeper slopes are used for pasture or have reverted to brush and forested land, while small fields of hay, corn, tobacco, and garden crops are grown on the foot slopes and bottom land.

- The **Southern Sandstone Ridges (67h)** ecoregion encompasses the major sandstone ridges, but these ridges also have areas of shale and siltstone. The steep, forested ridges have narrow crests, and the soils are typically stony, sandy, and of low fertility. The chemistry of streams flowing down the ridges can vary greatly depending on the geologic material. The higher elevation ridges are in the north, including Wallen Ridge, Powell Mountain, Clinch Mountain, and Bays Mountain. White Oak Mountain in the south has some sandstone on the west side, but abundant shale and limestone as well. Grindstone Mountain, capped by the Gizzard Group sandstone, is the only remnant of Pennsylvanian-age strata in the Ridge and Valley of Tennessee.

- The **Southern Dissected Ridges and Knobs (67i)** contain more crenulated, broken, or hummocky ridges, compared to the smoother, more sharply pointed sandstone ridges of 67h. Although shale is common, there is a mixture and interbedding of geologic materials. The ridges on the east side of Tennessee's Ridge and Valley tend to be associated with the Ordovician-age Sevier shale, Athens shale, and Holston and Lenoir limestones. These can

include calcareous shale, limestone, siltstone, sandstone, and conglomerate. In the central and western part of Ecoregion 67, the shale ridges are associated with the Cambrian-age Rome Formation: shale and siltstone with beds of sandstone. Chestnut oak forests and pine forests are typical for the higher elevations of the ridges, with areas of white oak, mixed mesophytic forest, and tulip poplar on the lower slopes, knobs, and draws.

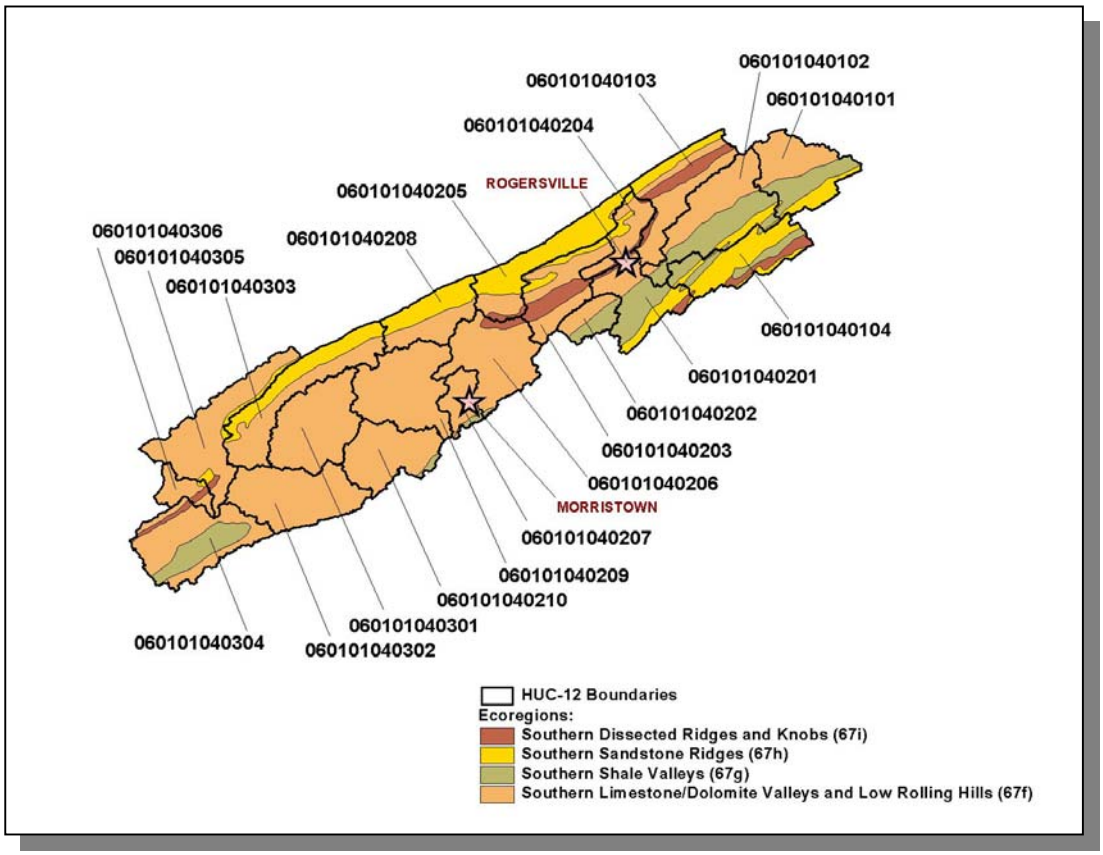

Figure 2-10. Level IV Ecoregions in the Holston River Watershed. *Locations of Morristown and Rogersville are shown for reference.*

Each Level IV Ecoregion has at least one reference stream associated with it. A reference stream represents a least impacted condition and may not be representative of a pristine condition.

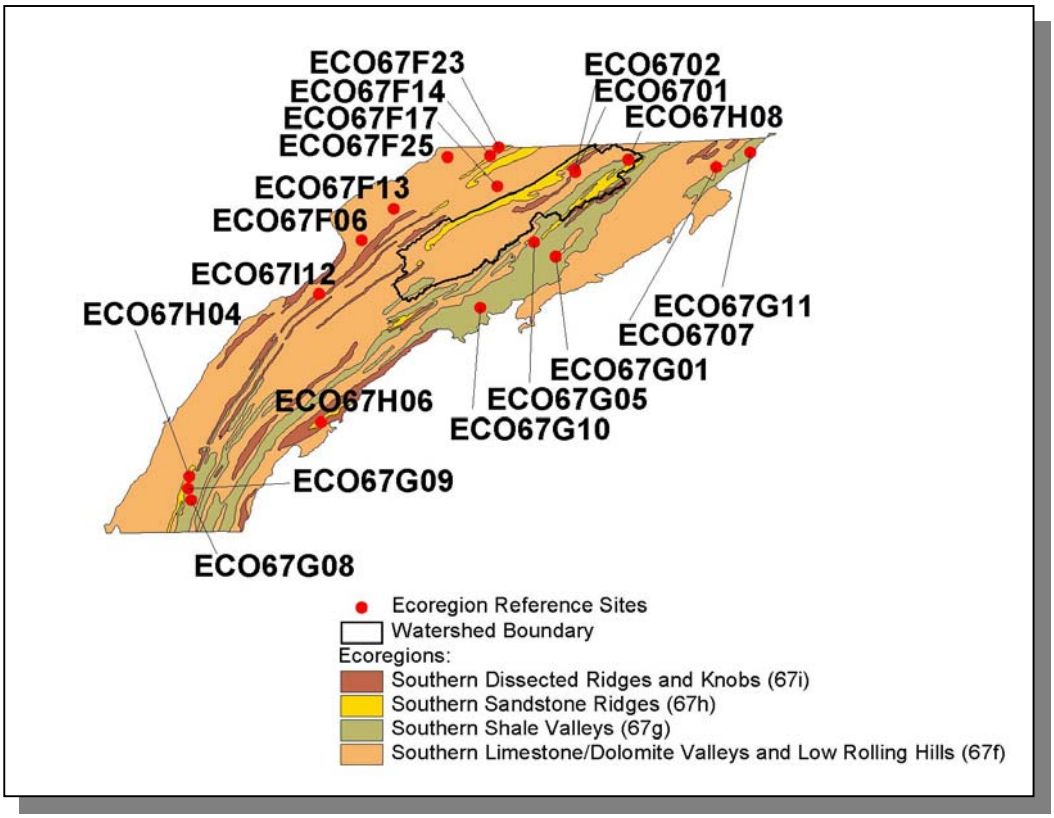

Figure 2-11. Ecoregion Monitoring Sites in Level IV Ecoregions 67f, 67g, 67h, and 67i. *The Holston River Watershed is shown for reference. More information, including which ecoregion reference sites were inactive or dropped prior to 01/01/2006, is provided in Appendix II.*

2.6. NATURAL RESOURCES.

2.6.A. Designated State Natural Area. The Natural Areas Program was established in 1971 with the passage of the Natural Areas Preservation Act. TDEC/Division of Natural Heritage administers the State Natural Areas program. Further information may be found at http://www.state.tn.us/environment/nh/natareas/

The Holston River Watershed has two Designated State Natural Areas:

Bays Mountain Class I Scenic-Recreational State Natural Area is a 3,000-acre natural area located only six miles from downtown Kingsport, Tennessee. This natural area is located in Sullivan and Hawkins Counties along the crest and inside slopes of Holston River Mountain and Bays Mountain in the Ridge and Valley Physiographic Province. When viewed from lower elevations, these two mountains, which are joined at their northern termini, appear to be a single ridge. But when inside the park, they form a natural and spectacular "bowl or basin" within which the park lies. The basin, surrounding slopes, and ridges are underlain with limestone, shale, and sandstone that support a diversity of plant and animal life.

House Mountain Class I Scenic-Recreational State Natural Area is an 850-acre natural area located in Knox County approximately eight miles from Knoxville. It is cooperatively managed under a lease agreement with the State by the Knox County Department of Parks and Recreation. The 2,100-foot crest of House Mountain provides significant vistas where visitors may scan the parallel ranges of the Unakas and Cumberlands some 50 miles away, or look northeast at the adjacent Clinch Mountain, and across the valley where the Trail of the Lonesome Pine is planned to lead north into Virginia.

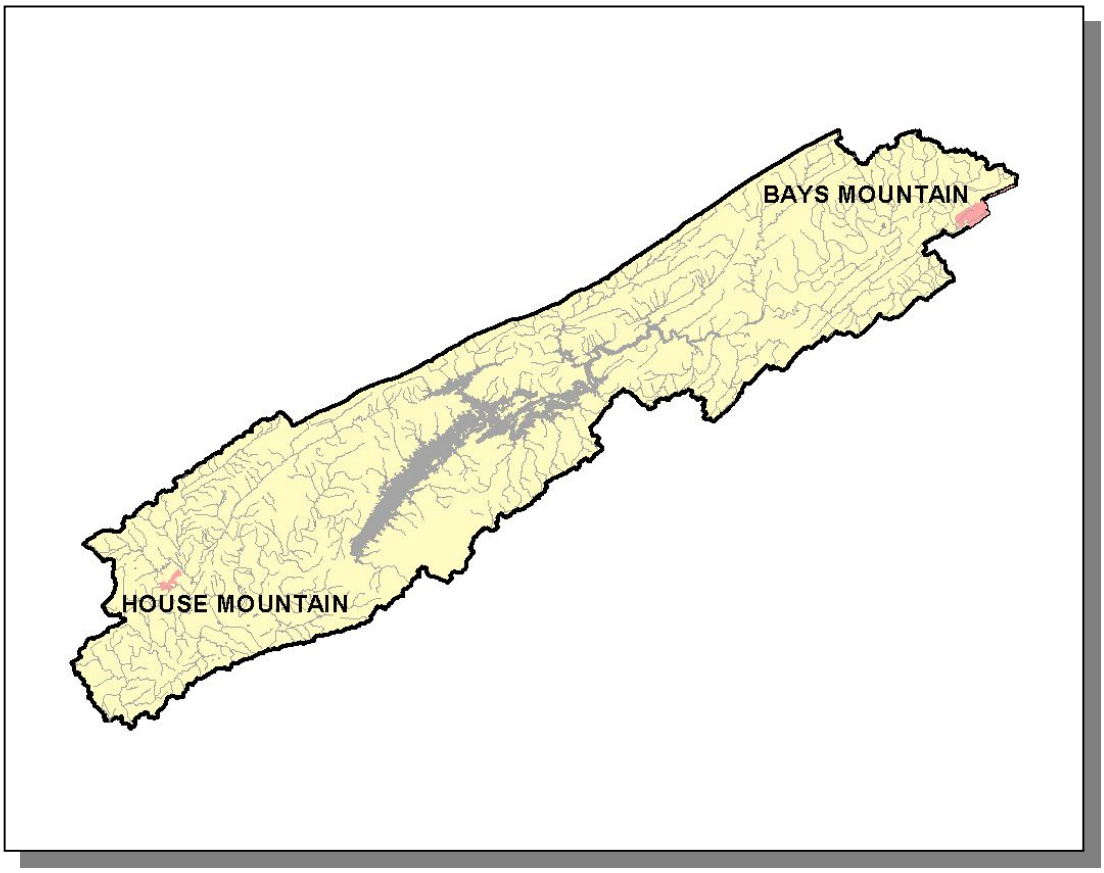

Figure 2-12. There are Two Designated State Natural Areas in the Holston River Watershed.

2.6.B. Rare Plants and Animals. The Heritage Program in the TDEC Division of Natural Heritage maintains a database of rare species that is shared by partners at The Nature Conservancy, Tennessee Wildlife Resources Agency, the US Fish and Wildlife Service, and the Tennessee Valley Authority. The information is used to: 1) track the occurrence of rare species in order to accomplish the goals of site conservation planning and protection of biological diversity, 2) identify the need for, and status of, recovery plans, and 3) conduct environmental reviews in compliance with the federal Endangered Species Act.

GROUPING	NUMBER OF RARE SPECIES
Insects/Spiders	3
Mussels	11
Snails	1
Birds	4
Fish	8
Mammals	7
Plants	22
Total	**56**

Table 2-3. There are 56 Known Rare Plant and Animal Species in the Holston River Watershed.

In the Holston River Watershed, there are eight known rare fish species, eleven known rare mussel species, and one known rare snail species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Carpiodes velifer	Highfin carpsucker		D
Cycleptus elongates	Blue sucker		T
Cyprinella monacha	Spotfin chub	LT	T
Erimystax cahni	Slender chub	LT	T
Percina aurantiaca	Tangerine darter		D
Percina burtoni	Blotchside darter		D
Percina tanasi	Snail darter	LT	T
Phoxinus tennesseensis	Tennessee dace		D
Conradilla caelata	Birdwing pearlymussel	LE	E
Cumberlandia monodonta	Spectaclecase		
Dromus dromas	Dromadary pearlymussel	LE	E
Fusconaia cuneolus	Fine-rayed pigtoe	LE	E
Fusconaia edgariana	Shiny pigtoe	LE	E
Lampsilis abrupta	Pink mucket	LE	E
Plethobasus cicatricosus	White wartyback	LE	E
Quadrula intermedia	Cumberland monkeyface	LE	E
Ventridens coelaxis	Bidentate dome		
Villosa perpurea	Purple bean	LE	E
Villosa trabalis	Cumberland bean	LE	E
Io fluvialis	Spiny riversnail		

Table 2-4. Rare Aquatic Species in the Holston River Watershed. *Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service, MC, Management Concern for U.S. Fish and Wildlife Service. State Status: E, Listed Endangered by the Tennessee Wildlife Resources Agency; D, Deemed in Need of Management by the Tennessee Wildlife Resources Agency. More information may be found at http://www.state.tn.us/environment/na/.*

2.6.C. Wetlands. The Division of Natural Heritage maintains a database of wetland records in Tennessee. These records are a compilation of field data from wetland sites inventoried by various state and federal agencies. Maintaining this database is part of Tennessee's Wetland Strategy, which is described at:

http://www.state.tn.us/environment/nh/wetlands/

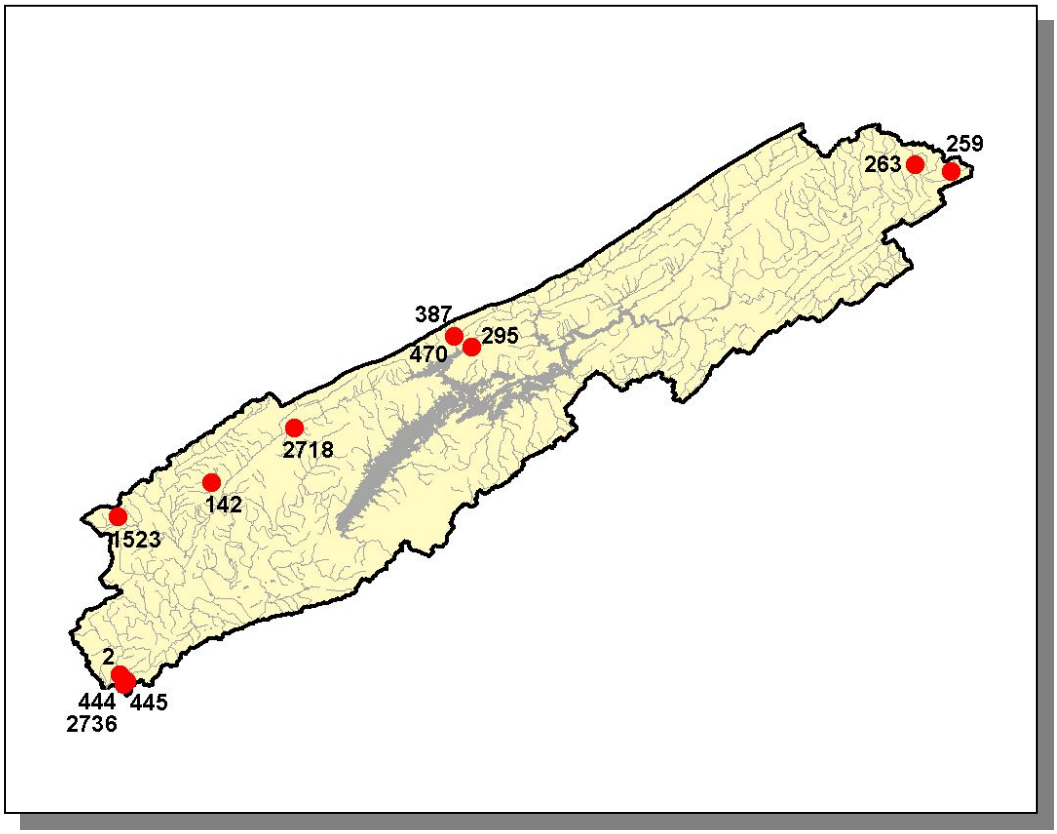

Figure 2-13. Location of Wetland Sites in TDEC Division of Natural Heritage Database in Holston River Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. *There may be additional wetland sites in the watershed. More information is provided in Appendix II.*

2.7. CULTURAL RESOURCES.

2.7.A. Nationwide Rivers Inventory. The Nationwide Rivers Inventory, required under the Federal Wild and Scenic Rivers Act of 1968, is a listing of free-flowing rivers that are believed to possess one or more outstanding natural or cultural values. Exceptional scenery, fishing or boating, unusual geologic formations, rare plant and animal life, cultural or historic artifacts that are judged to be of more than local or regional significance are the values that qualify a river segment for listing. The Tennessee Department of Environment and Conservation and the Rivers and Trails Conservation Assistance branch of the National Park Service jointly compile the Nationwide Rivers Inventory from time to time (most recently in 1997). Under a 1980 directive from the President's Council on Environmental Quality, all Federal agencies must seek to avoid or mitigate actions that would have an adverse effect on Nationwide Rivers Inventory segments.

The most recent version of the Nationwide Rivers Inventory lists portions of four streams in the Collins River Watershed:

> Holston River (RM 0 to RM 53) is a scenic stream segment affording excellent duck hunting and fishing.

RIVER	SCENIC	RECREATION	GEOLOGIC	FISH	WILDLIFE	HISTORIC	CULTURAL
Holston River	X	X	X	X	X	X	X

Table 2-5. Attributes of Streams Listed in the Nationwide Rivers Inventory.

Additional information may be found online at http://www.ncrc.nps.gov/rtca/nri/

2.7.B. Public Lands. Some sites representative of the cultural heritage are under state or federal protection:

- Bays Mountain Park is a 3500-acre park featuring a 44-acre lake. Most of the Park is in the South Fork Holston River Watershed. More information may be found at http://www.baysmountain.com/.

- Buffalo Springs Wildlife Management Area a 342-acre area managed by TWRA in Grainger County.

- Cherokee Dam Public Camping Area is a 41-site campground located along the shores of Cherokee Lake. More information may be found at http://www.tva.gov/river/recreation/camping.htm#cherokee.

- Cherokee Park is a 74-site campground located along the shores of Cherokee Lake. More information may be found at http://www.tnvacation.com/vendors/cherokee_park_campground/.

- Fall Creek Public Camping Area (Campground and Marina) is located on Cherokee Lake. More information may be found at http://fallcreekmarinaoncherokee.com/index.html.

- Grainger County Park is located in Rutledge.

- Holston Ordinance Works Wildlife Management Area is a public hunting area managed by the Tennessee Wildlife Resources Agency and Holston Army Ammunition Plant.

- John Sevier Dam Public Use Area is a campground operated by the Tennessee Valley Authority on the Holston River near Rogersville.

- John Sevier Refuge Wildlife Management Area is a state waterfowl refuge located in Hawkins County managed by the Tennessee Wildlife Resources Agency.

- May Springs Public Camping Area (Greenlee Campground) is located along the shores of Cherokee Lake in Rutledge. More information may be found at http://www.tnvacation.com/vendors/greenlee_campground_may_springs.

- Panther Creek Park is a 1,435-acre state park located along the shores of Cherokee Lake. More information may be found at http://www.state.tn.us/environment/parks/parks/PantherCreek.

- Phipps Bend Refuge is a 315-acre refuge located along the Holston River in Hawkins County and managed by the Tennessee Wildlife Resources Agency.

- Rogersville Historic District is listed on the National Register of Historic Places. It has the largest number of Federal-style architecture in the state. More information may be found at http://www.rogersville.us/attractdetail.htm.

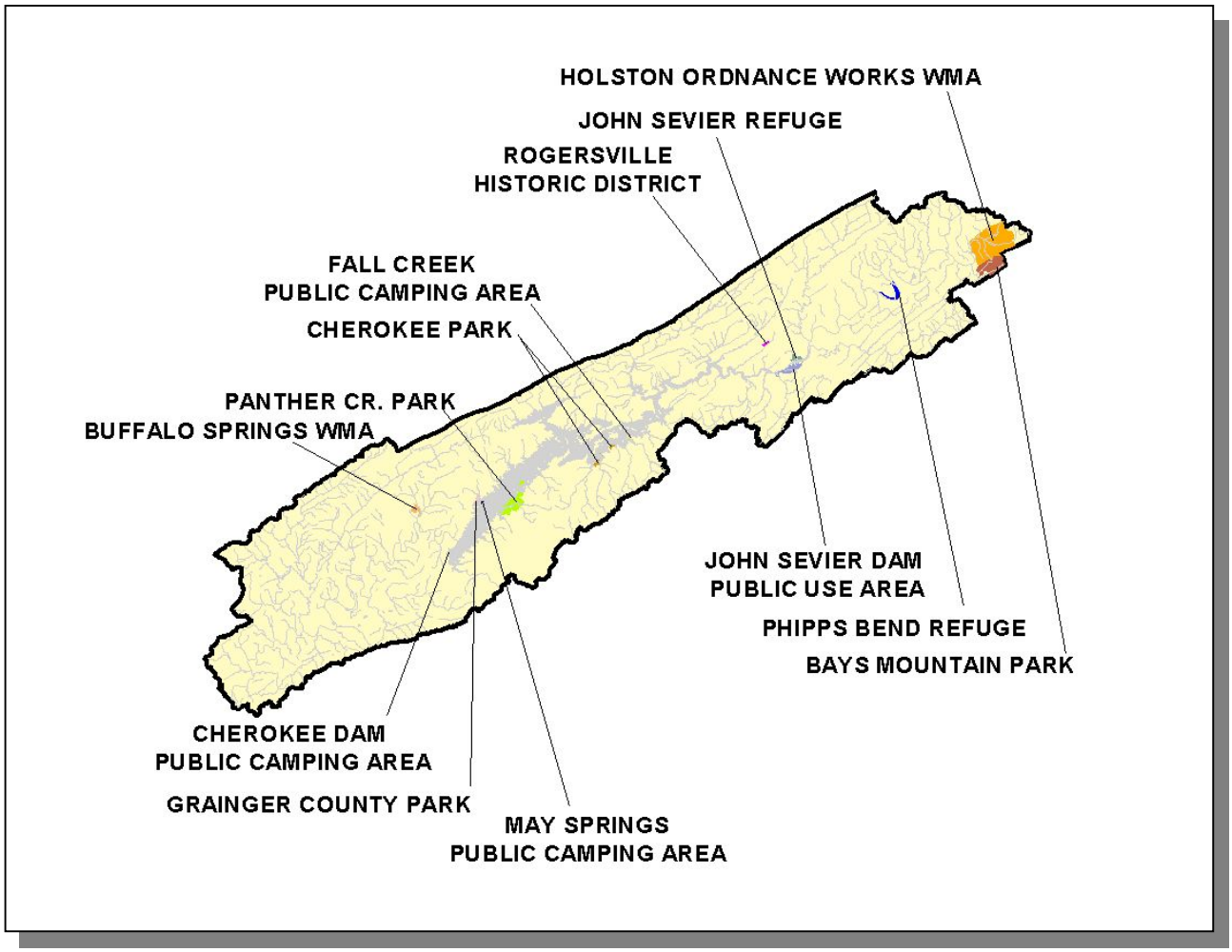

Figure 2-14. Public Lands in the Holston River Watershed. *Data are from Tennessee Wildlife Resources Agency. WMA, Wildlife Management Area.*

2.8. TENNESSEE RIVERS ASSESSMENT PROJECT. The Tennessee Rivers Assessment is part of a national program operating under the guidance of the National Park Service's Rivers and Trails Conservation Assistance Program. The Assessment is an inventory of river resources, and should not be confused with "Assessment" as defined by the Environmental Protection Agency. A more complete description can be found in the Tennessee Rivers Assessment Summary Report, which is available from the Department of Environment and Conservation and on the web at:

http://www.state.tn.us/environment/wpc/publications/riv/

STREAM	NSQ	RB	RF	STREAM	NSQ	RB	RF
Beaver Creek	4			Honeycutt Creek	3		
Beech Crek	2		2	Little Flat Creek	3		
Big Creek	3		1	Mossy Creek	4		1
Bradley Creek	3			North Fork Beech Creek	3		
Caney creek	3			Panther Creek	3		
Cedar Creek	3			Poor Valley Creek	3		2
Cloud Creek	3		2	Richland Creek	4		2
Crockett Creek	4			Robertson Creek	3		2
Dodson Creek	3			Roseberry Creek	3		
Dryland Creek	4			Stanley Creek	2		2
Fall Crek	3			Stubblefield Creek	3		
Fisher Creek	3			Swanpond Creek	3		
Flat Creek	3		2	Thompson Creek	3		
Hard Creek	3		2	Turkey Creek	4		
Holston River	2,3	1,2	1,2	Young Creek	3		

Table 2-6. Stream Scoring from the Tennessee Rivers Assessment Project.

Categories: NSQ, Natural and Scenic Qualities
RB, Recreational Boating
RF, Recreational Fishing

Scores: 1. Statewide or greater Significance; Excellent Fishery
2. Regional Significance; Good Fishery
3. Local Significance; Fair Fishery
4. Not a significant Resource; Not Assessed